REMARKS

Claims 12-25, 27-29 and 31-38 are pending in this application. Claims 12-24 have been withdrawn. Claims 25, 28, 29, and 36 are currently amended.

Claims 25 and 36 are amended to restrict the claims to the elected probe of HPV-16 (SEQ ID NO: 1) and in matters of grammar. Claims 25 and 36 are further amended to indicate that the DNA chip comprises a glass slide to which the probes are attached. These amendments are supported by the specification as filed (see for example, page 7, lines 27-29 and page 10 lines 13-27).

Claim 28 is amended to remove the reference to a previously cancelled claim.

Claim 29 is amended to restrict the claim to the elected primer pair of GP5+ (SEQ ID NO: 22) and GP6+ (SEQ ID NO: 23).

Thus, none of the amendments introduces new matter to the application. Entry and consideration of the amendments is therefore respectfully requested.

I. Rejection of Claims 25-35 under 35 U.S.C. § 122, Second Paragraph has been Withdrawn

Applicants gratefully acknowledge Examiner's withdrawal of the prior rejection of claims 25-35 as indefinite under 35 U.S.C. § 122, Second Paragraph.

II. Restriction Requirement

Applicants acknowledge, with traverse, Examiner's statement that the restriction requirement is made final. Applicants acknowledge with traverse, Examiner's requirement that the claims be restricted to the elected probe of HPV-16 (SEQ ID NO: 1), and the elected primer pair of primer GP5+ (SEQ ID NO: 22) and GP6+ (SEQ ID NO: 23). In order to be fully responsive, claims 25 and 36 have been amended to recite only the elected probe of HPV-16 (SEQ ID NO: 1) and claim 29 has been amended to recite only the elected primer pair of primer GP5+ (SEQ ID NO: 22) and GP6+ (SEQ ID NO: 23).

Applicants do not find the restriction to a single probe and a single primer pair well-founded or even within the scope of a permissible restriction requirement. The present invention is **not** attempting to claim the individual, disparate HPV nucleic acids. To the contrary, the purpose of the instant invention is to identify *which* of the disparate HPV strains is present in a biological sample. In order to do this, it is necessary to have an array of HPV strains to which a sample DNA can be evaluated for hybridization. Therefore, restricting the array to a single probe would essentially **defeat the purpose of the invention** since it would necessitate the use of about 20 separate arrays per sample to achieve the object of the invention, i.e., diagnosis of an HPV strain. It is submitted that the Examiner does not need to search individual sequences in order to examine the present claims. The Examiner has not yet cited any prior art that is directed to a DNA chip comprising HPV nucleic acid probes and a glass slide to which the probes are attached, so it is presumed that no such DNA chip was known until the present invention. Accordingly, no searching can required for specific HPV sequences which would be present on such a DNA chip, since the DNA chip is non-existent. It is reiterated that the claims are not drawn to individual HPV sequences, or primers, which Applicants acknowledge were previously known, instead, the claim is to a diagnostic method using the sequences.

Applicants therefore reserve the right under 37 C.F.R. 1.144 to petition the Commissioner to review the propriety of this restriction requirement. Applicants reserve the right to pursue the subject matter of non-elected claims, and to pursue claims encompassing the use of non-elected probes and non-elected primer pairs in the methods of the invention, in this application or related applications.

III. The Claim Rejections Under 35 U.S.C. § 103 Should Be Withdrawn

The Examiner has maintained the rejection of claims 25 and 28 under 35 U.S.C. § 103(a) as unpatentable over Gravitt et al. *J. Clin. Microbiol.* 1998;36:3020-3027 (herein "Gravitt) in view of Stratagene catalog, 1988 (herein "Stratagene"). In maintaining this rejection, the Examiner acknowledges applicants' previous argument that Gravitt does not teach a "DNA chip", but states that the limitations regarding the definition of the chip must be present in the claims.

In order to comply with the Examiner's requirement that the limitations regarding the definition of the chip be present in the claims, claims 25 and 28 have been amended to indicate that the DNA chip comprises probes having an HPV nucleic acid sequence and a glass slide to which the probes are attached. Therefore, this rejection should be withdrawn.

The Examiner has maintained the rejection of Claim 29 under 35 U.S.C. § 103(a) as unpatentable over Gravitt in view of Stratagene and further in view of PCT International Application WO 95/22626. In maintaining this rejection, the Examiner acknowledges applicants' previous argument that Gravitt does not teach a "DNA chip", but states that the limitations regarding the definition of the chip must be present in the claims.

In order to comply with the Examiner's requirement that the limitations regarding the definition of the chip be present in the claims, claim 25 (from which claim 29 depends) has been amended to indicate that the DNA chip comprises probes having an HPV nucleic acid sequence and a glass slide to which the probes are attached. Therefore, this rejection should be withdrawn.

The Examiner has maintained the rejection of Claim 27 under 35 U.S.C. § 103(a) as unpatentable over Gravitt in view of Stratagene and further in view of Bevan et al. *Biochem J.* 1990;267:119-123 (herein "Bevan"). In maintaining this rejection, the Examiner acknowledges applicants' previous argument that Gravitt does not teach a "DNA chip", but states that the limitations regarding the definition of the chip must be present in the claims.

In order to comply with the Examiner's requirement that the limitations regarding the definition of the chip be present in the claims, claim 25 (from which claim 27 depends) has been amended to indicate that the DNA chip comprises probes having an HPV nucleic acid sequence and a glass slide to which the probes are attached. Therefore, this rejection should be withdrawn.

The Examiner has maintained the rejection of Claim 31 under 35 U.S.C. § 103(a) as unpatentable over Gravitt in view of Stratagene and further in view of US Patent 5,273,881 to Sena et al. (herein "Sena"). In maintaining this rejection, the Examiner acknowledges applicants' previous argument that Sena does not teach a "DNA chip", but states that the limitations regarding the definition of the chip must be present in the claims.

In order to comply with the Examiner's requirement that the limitations regarding the definition of the chip be present in the claims, claim 25 (from which claim 31 depends) has been amended to indicate that the DNA chip comprises probes having an HPV nucleic acid sequence and a glass slide to which the probes are attached. Therefore, this rejection should be withdrawn.

The Examiner has maintained the rejection of Claims 32-35 under 35 U.S.C. § 103(a) as unpatentable over Gravitt in view of Stratagene and further in view of US Published Application 2003/0012695 to Shalon (herein "Shalon").

In maintaining this rejection, the Examiner states that Shalon teaches that a microarray (DNA chip) can be used in genotyping and diagnostic assays and provides the advantages of assaying a plurality of samples simultaneously, ease of use, and highly sensitive detection (citing paragraphs 40, 64, 69, and 96). The Examiner concludes that one of ordinary skill in the art would have been motivated to use the microarray of Shalon as a chip in the hybridization method of Gravitt. In maintaining this rejection, the Examiner further states that the limitations regarding the definition of the "DNA chip" must be present in the claims.

In order to comply with the Examiner's requirement that the limitations regarding the definition of the chip be present in the claims, claim 25 (from which claims 32-35 depend) has been amended to indicate that the DNA chip comprises probes having an HPV nucleic acid sequence and a glass slide to which the probes are attached.

Applicants' respectfully submit that Shalon teaches away from the present invention. Shalon teaches that the probes immobilized on the microarray should be at least 50 nucleotides in length (see, for example, paragraphs 61, 64, and 77). In contrast, in the method of the instant invention, the probes on the DNA chip are only 30 nucleotides in length. In particular, note that the sequence of SEQ ID NO: 1, as recited in claim 25 (from which claims 32-35 depend), is 30 nucleotides in length:

5'-GTCATTATGTGCTGCCATATCTACTTCAGA-3' (SEQ ID NO: 1)

Thus, neither Gravitt nor Shalon provide the motivation to combine the hybridization method of Gravitt for detection of HPV sequences with a DNA chip comprising probes having an HPV nucleic acid sequence of 30 nucleotides in length and a glass slide to which the probes are attached (as recited in claim 25). To the contrary, Shalon teaches that the probes on the microarray should be at least 50 nucleotides in length, and therefore teaches that the

hybridization method of Gravitt would not work for a microarray having probes of only 30 nucleotides in length. Therefore, this rejection should be withdrawn.

The Examiner has maintained the rejection of Claims 32-33 and 35 under 35 U.S.C. § 103(a) as unpatentable over Gravitt in view of Stratagene and further in view of Zammatteo et al. *Anal. Biochem.* 2000;280:143-150 (herein "Zammatteo").

The present application represents the US National Phase prosecution of PCT international application PCT/KR00/01213 filed October 26, 2000, and claims priority to Korean patent application number 2000-13161 filed March 15, 2000. This claim for priority was properly affirmed, and perfected by submission of an English translation of the priority application. Therefore, the present application is entitled to a priority date of March 15, 2000. Zammatteo was published on April 10, 2000 (see Exhibit 1). As this publication date is after the priority date of March 15, 2000, Zammatteo does not constitute prior art under 35 U.S.C. § 103(a). Therefore, this rejection should be withdrawn.

It is respectfully submitted that the invention, as recited in the currently pending claims, would not have been *prima facia* obvious to one of ordinary skill in the art at the time the invention was made. Therefore, the rejections should be withdrawn.

IV. Claim Objections

In response to Examiner's requirement that the claims be restricted to the elected probe of HPV-16 (SEQ ID NO: 1), and the elected primer pair of primer GP5+ (SEQ ID NO: 22) and GP6+ (SEQ ID NO: 23), claims 25 and 36 have been amended to recite only the elected probe of HPV-16 (SEQ ID NO: 1) and claim 29 has been amended to recite only the elected primer pair of primer GP5+ (SEQ ID NO: 22) and GP6+ (SEQ ID NO: 23). Therefore, the claim objections should be withdrawn.

As stated above, applicants acknowledge this requirement **with traverse**. Applicants do not find the restriction to a single probe and a single primer pair well-founded or even within the scope of a permissible restriction requirement. Applicants reserve the right under 37 C.F.R.

1.144 to petition the Commissioner to review the propriety of this restriction requirement. Applicants reserve the right to pursue the subject matter of non-elected claims, and to pursue claims encompassing the use of non-elected probes and non-elected primer pairs in the methods of the invention, in this application or related applications.

V. Conclusion

It is respectfully submitted that the amendments and remarks presented here overcome and/or obviate each basis for objection and rejection set forth in the Office Action. The specification and pending claims, as amended, are all believed to be in immediate condition for allowance. Accordingly, the withdrawal of all objections and rejections is respectfully requested. An allowance is earnestly sought.

It is believed that no additional fees are required for these submissions. However, should it be found that a fee is required or a refund owed for this application, the Director is authorized to credit any overpayments and/or charge any additional fees during the pendancy of this application to our Deposit Account No. 04-0100.

Respectfully submitted,

Dated: June 29, 2005

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ANALYTICAL BIOCHEMISTRY

Volume 280, Number 1, April 10, 2000

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